

Ser. No. 10/618,059

Amendments to the Claims

1. (Currently amended) A coolant nozzle for use on a machine tool having a rotating bit, the nozzle comprising a sintered ceramic body having:
 - at least one coolant inlet;
 - at least one coolant outlet;
 - internal surface portions defining one or more passageways between the at least one coolant inlet and at least one coolant outlet; and
 - an aperture for accommodating the bit.
2. (Currently amended) The nozzle of claim 1 wherein the internal surface portions are formed in a laser sintered ceramic body is a single unitary piece.
3. (Original) The nozzle of claim 1 wherein the one or more passageways includes a plenum surrounding the aperture.
4. (Original) The nozzle of claim 1 wherein the at least one coolant outlet comprises a plurality of coolant outlets symmetric around an axis.
5. (Original) The nozzle of claim 1 wherein the at least one coolant outlet comprises a plurality of coolant outlets positioned to direct associated coolant outlet streams toward an axis of the bit when said bit is in an installed position.
6. (Original) The nozzle of claim 5 wherein the plurality of coolant outlets are elongate.
7. (Original) The nozzle of claim 5 wherein the plurality of coolant outlets comprises at least five outlets and the at least one coolant inlet is a single coolant inlet.
8. (Original) The nozzle of claim 1 wherein the aperture has a diameter of less than 3cm.

Ser. No. 10/618,059

9. (Original) The nozzle of claim 1 in combination with the machine tool and bit and wherein a plurality of coolant outlet streams exit the at least one outlet and impact obliquely along a side of the bit.

10. (Currently amended) A coolant nozzle for use on a machine tool having a rotating bit, the nozzle comprising:

a through-aperture for accommodating the bit;

a coolant inlet;

a plurality of coolant outlets at more than one angular position about the through-aperture and oriented to discharge associated coolant outlet streams to impact obliquely toward a tip of the bit along a side of the bit, circumferential spacing between adjacent ones of the outlets being no more than 72°; and

internal surface portions defining one or more passageways between the coolant inlet the and the plurality of coolant outlets.

11. (Original) The coolant nozzle of claim 10 wherein the plurality of coolant outlets are each at a common radial position relative to an axis and are each at a unique angular position about said axis.

12. (Original) The coolant nozzle of claim 11 wherein there are no other coolant outlets in addition to the plurality of coolant outlets.

13. (Original) The coolant nozzle of claim 10 wherein the nozzle surrounds a full 360° of the through-aperture.

14. (New) The nozzle of claim 1 wherein the at least one coolant outlet is angled to provide essentially total coverage along a length of an abrasive portion of the bit.

15. (New) The nozzle of claim 1 wherein the at least one coolant outlet provides a redundant coverage around the circumference of the quill so that, during a machining operation, the effects

Ser. No. 10/618,059

of a workpiece blocking one or more sprays of the coolant are limited.

16. (New) A coolant nozzle in combination with a machine tool having a rotating abrasive quill, the nozzle comprising:

at least one coolant inlet;

at least one coolant outlet discharging a plurality of liquid coolant outlet streams impacting obliquely toward a tip of the quill along a side of the quill;

internal surface portions defining one or more passageways between the at least one coolant inlet the and at least one coolant outlet; and

an aperture accommodating the quill.

17. (New) The nozzle of claim 16 wherein the coolant outlet streams impact the quill along essentially an entire circumference of the quill.

18. (New) The nozzle of claim 16 formed of a sintered ceramic.

19. (New) The nozzle of claim 16 wherein the at least one coolant outlet comprises at least five outlets and the at least one coolant inlet is a single coolant inlet.

20. (New) A coolant nozzle in combination with a machine tool having a rotating bit, the nozzle comprising:

a through-aperture accommodating the bit;

a coolant inlet;

a plurality of coolant outlets at more than one angular position about the through-aperture and oriented to discharge associated coolant outlet streams and having circumferential spacing between each of the outlets and an associated two adjacent ones of the outlets of no more than 72°; and

internal surface portions defining one or more passageways between the coolant inlet the and the plurality of coolant outlets.